New Frontiers for American Agriculture and Forestry
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The New Uses Council is dedicated to the development of new uses for all agricultural and forestry crops and residues (including clean biomass heading for dumps and landfills). Among these new uses are the production of biofuels, bioelectricity and cogenerated thermal energy, and chemicals including lubricants, paints, solvents, adhesives, inks, cleaners, etc.

American agriculture is superbly positioned to address several national concerns:

- By decreasing our dependence on foreign oil, homeland security is protected in a number of ways:
  - Less money is given to nations that in turn fund – directly or indirectly – terrorist activities.
  - Economic entanglements with foreign countries that can press us into war are significantly reduced.
  - Diversification and dispersion of energy production facilities limit the likelihood of both energy shortages as well as our susceptibility to terrorist activity directed at critical power and fuel producing plants.
- The production of new industries and quality jobs;
- A stronger economy through reductions in our national trade deficit;
- Preservation of the family farm;
- Replacing crop subsides administered by developed nations with incentives for biobased fuels, electricity and products. This would strengthen their economies by reducing the need for fossil imports. This would also improve the economies of developing nations by giving their crops more equitable access to world markets since these nations are unable to afford crop subsidies;
- Better protection of forests from wildfires as well as developing new markets for woody biomass;
- Reducing urban sprawl, road and highway encroachment on farm, grazing and forested lands;
- The protection of wildlife and their habitat;
- General environmental enhancement through the reduction of greenhouse gases, integrated farm management, soil enhancement…etc.
- Providing leadership to the rest of the world on environmental issues while softening the international perception – and resentment – concerning our consumer-driven way of life.

Consequently, it is recommend that USDA, DOE, EPA, DOI as well as other departments and agencies and state and local governments, fully explore these emerging frontiers of new use products.

What follows are the broad-based goals of the New Uses Council. We have not addressed the specifics outlined in the guidance provided by Under Secretary Thomas Door, but trust that identifying these major areas will be helpful in meeting the intent of 9006 of the Farm Security and Rural Investment Act of 2002. It is requested that funds available under the Act be made available to these priorities.

Thankfully, USDA and other government departments and agencies are becoming increasingly active in these areas. But much more needs to be done as these new avenues are explored. They include:

1. Accelerated bridge building within a broad spectrum of environmental organizations. Too often, opposition to biofuels, biopower and bio-based products is rooted in old animosities, misinformation and exaggerated concerns about the environmental impact of the carbohydrate economy. The ability of a well-managed bio-based economy to reduce the environmental pressures of a fossil-based economy is often ignored or minimized. A rational, concerted and cooperative effort is needed to address the concerns of the environmental community.

2. Legislative and policy initiatives as well as more focused biomass research, development and deployment budgets at the federal and state levels (coordinated as much as possible) are priorities for the New Uses Council. Legislative support is essential in expanding the market for biofuels. Limited market opportunities are the main impediment in advancing biofuels technologies and bioproducts, and in constructing new facilities.

3. Governments should press the world's major auto/truck manufactures to recommend renewable fuels (bioethanol, biodiesel and other biofuels) for use in their vehicles. This is particularly true of their high mileage, hybrid electric, and fuel cell powered vehicles with onboard reformers for the conversion of carbon/hydrogen-based fuels to hydrogen. The use of other bio-based products like lubricants, greases, carpets and, panels should also be recommended. There are executive orders and legislation supporting this suggestion. Expanding the market for biofuels and bio-based products should be a major goal of Section 9006 of the Act. The government's "Buy Bio" campaign should be supported and accelerated.

4. Establish a positive, working and supportive relationship between the various proponents of the biofuels industry. This would include corn-to-ethanol, oil seeds-to-biodiesel, cellulosic biomass-to-biofuels and animal fats- and used cooking oils-to biodiesel technologies. Almost a quarter century of hard work, major economic and political investments, and dealing with powerful opposition, has brought the biorefinery concept to its present launch threshold. These pioneering biofuel industries and their supporters cannot and should not be denied a major role in the future development of these technologies. At the same time, emerging technologies producing biofuels should be treated equitably.

   In the arena of ethanol, the underlying issue is the cost of providing, harvesting and converting feedstocks into fermentable sugars for further conversion into a wide range of products. (How best to use these products is another issue as well.) Environmental factors are vital in this process. Enzymatic and thermal chemical processes hold great promise, as does the conversion of cellulosic biomass into hydrogen. These advances can be incorporated into large ethanol biorefineries and farm-community, integrated energy and feed systems producing the *6 Fs*: food, feed, fiber, fertilizers, fuels and chemical feedstocks.

   In the biodiesel arena, the finished fuel must be feedstock neutral, with ASTM and performance standards the only controlling requirements

5. Extend the New Uses concepts beyond crops and residues to include "new uses" of farming, grazing and forestry lands. There are three major opportunities here:

- Make these lands available to hunters, fishermen and other outdoor adventurers following procedures that are profitable to land owners, but that also preserve and perhaps even enhance the environment and wild life habitat while increasing wild life and promoting their diversity.

  Satisfying the concerns of protectors of wildlife and animal-rights advocates requires another level of full cooperation. Hopefully, we can work together in understanding that farmers, ranchers and foresters and their lands are just as endangered as wildlife. The "proper" protection of one is the enhanced protection of the other.

  A global effort is underway to deal with the issues of farm subsides administered by disparate governments. Nations that are presently unable to afford such subsidies are negatively impacted. Furthermore, forests, fragile lands, waterways, farms, ranches and forests all over the world are threatened by urban sprawl. Increasingly, farming is being pushed by this sprawl into lands – like the rainforests – that should be preserved. Bringing new income to farmers, ranchers and foresters through "new uses" of and "value-added benefits" to their lands are powerful tools to deal with these problems. This is in addition to the production of value-added biofuels, biopower and biochemicals to increase the profitability of the land.

- Farm, grazing and forestry lands, if “worked” in a sustainable and environmental enhancing manner, will sequester and store carbon and reduce methane and CO2 emissions by limiting biomass degradation through microbial action. Additionally, prudent application of biobased fertilizers will reduce N2O emissions (a powerful greenhouse gas). This combination will benefit land owners through the marketing of carbon credits.

- By sharing land with wind farms, solar energy arrays, geothermal wells and incremental hydroelectric, land owners as well as the environment are benefited.

6. Balance the need for economies of scale with the benefits of the economies of integration and value. The potential of these integrated farm energy and feed systems can be further enriched by multiple use of equipment, computer control systems, roads and facilities and by cascading every drop of water, nutrient and Btu repeatedly through the system. These benefits can be furthered by cross training the work force to increase efficiency and add new and valuable dimensions to the lives of workers.

   These are not idealistic notions; they are being experienced throughout the Midwest in large facilities and in the new ethanol, coop-owned plants already operational, under construction or in the final stages of permitting/financing. They will continue to improve to the benefit of all. When lesser-cost sugars from corn-stover, switch grass, hybrid trees and plants become available, their incorporation into these integrated, value-added facilities will be routine. Demonstrations are already underway. Furthermore, human waste and other biomass waste from nearby urban areas are even now being incorporated into anaerobic digesters, resulting in greater energy and environmental enhancements.

   These integrated *6 Fs* systems have additional advantages when they are smaller and dispersed. The energy density of the feedstocks, the opportunities to ensure

environmental and family-worker life enhancement, and the major energy, national and homeland security advantages of these dispersed systems, counter-balance the former imperative to strive for greater economies of scale. This dimension is even more valuable in developing countries, those with a shortage of arable land, or nations that have scenic lands they want to conserve.

With attacks mounting against confined animal feeding operations (CAFOs), it is important to phase in this concept of Ecological Industrial Agriculture (EIA). This cross between the family farm of yesteryear and the modern industrial agriculture complex of today encourages full participation and ownership opportunities for farmers and neighboring communities. There is also a promising place for organic farmers to serve workers in modern EIA complexes and share in their ability to market value-added products directly to consumers. In addition, these farmers will provide a market for the organic, biofertilizers produced by some of these complexes.

Military needs for forward-deployed energy and fuel systems using locally available feedstocks will likely help provide the research, development and deployment necessary to miniaturize and automate these integrated biorefineries.

7. Fossil fuels (oil, gas and coal) presently exert a major influence on, and some might even say drive, the American economy. They have a powerful impact on our national security and the environmental footprint the United States leaves on the world. The transition from a fossil-hydrocarbon to a renewable-carbohydrate economy (including hydrogen and the other renewables – solar, wind, geothermal and advanced, incremental hydro) is critical to addressing many of the negative consequences of our dependence on fossil fuels.

   Actions are already underway. Increasingly, the oil industry is accommodating higher volumes of ethanol and biodiesel. Coal-fired power plants are using or exploring biomass as a co-fuel. Industries that formerly relied solely on petrochemicals to produce plastic, paints, solvents, etc. are including biomass as a feedstock; some, like Cargill-Dow, in a major way.

   This transition must be gradual, logical and sensitive to a great number of factors and economic and environment conditions. Continued “shoot outs” for market share and for lobbied-for-privileges will likely continue. Centralized planning will not be able to withstand the reality of market pressures – free market forces should prevail. But, we can and must pursue thoughtful discussions; cooperative and focused research, development and deployment; the commercialization of new technologies and processes; insightful tax codes and national policies; cooperative commitments on all sides to the benefit of America’s position in the world and to future generations; a determination to enhance the environment and stabilize greenhouse gas emissions; and a commitment to preserve and protect God’s creation and all living things.

Final dividends

If we are able to bring together all of the like-minded people (referred to above) in common cause, with the determined support of the government, a minor miracle and a major contribution to America and the planet will occur.

We need this minor miracle to:

- Effectively deal with worldwide agricultural subsidies to the benefit of America's farmers and ranchers;
- Bring young Americans back into the agricultural and forestry sectors by providing the financial and meaningful life so attractive to people, particularly the young;
- Generate new industries and quality jobs;
- Position farm, grazing and forested lands to provide meaningful recreation and learning experiences for people who have more time and money because of continually advancing science and technology;
- Promote friendly and legitimate competition while benefiting the nation and its environment and opening markets for the full range of bio-based products;
- Gain the support of the environmental community for biorefinery concepts; and
- Work cooperatively with the oil, gas, coal and nuclear industries in the timely transition from the hydrocarbon to the bio-based economy.

Again, the New Uses Council <new uses.org> believes addressing these opportunities was among the underlying reasons for Section 9006 of the Act. Appropriate funding is recommended.